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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/588,227

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EXAMINER

SLIFKA, COLIN W

ART UNIT

PAPER NUMBER

1793

MAIL DATE

DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/588,227	Applicant(s) ISHIKAWA ET AL.	
	Examiner COLIN W. SLIFKA	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 November 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 6-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 6-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>11/4/2009</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-4, and 6-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugiura et al (US 2002/0038732) in view of Peng (US 7,130,205) and further in view of Tsuchiya (JP 2003-235252).

Sugiura teaches a dc power supply using a fuel cell, wherein the fuel cell is connected to a rechargeable/dischargeable battery via a DC-DC converter (par. 7 and Fig. 1).

While Sugiura discloses that the output voltage of the DC-DC converter can be varied (par. 42), Sugiura does not teach that the converter comprises a plurality of phases.

Peng teaches that three-phase bridge converters are typical voltage converters used with batteries, fuel cell stacks, etc. (col. 1, lines 19-22). Traditional three-phase voltage converters include six switches, which are controlled by a control unit to provide a desired output (col. 1, lines 25-32). The invention of Peng includes a switch array that is controlled by a control unit to provide single or multiple phase power (col. 3, lines 65-67).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use a three-phase bridge converter in the invention of Sugiura in order to be

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able to vary the phases and achieve the desired output, as Peng teaches that such converters are commonly used with fuel cells.

Neither Sugiura nor Peng explicitly describe a control method of the system incorporating varying the phases.

Tsuchiya teaches a method of operating a DC-DC converter, wherein a controller controls a "master" DC-DC converter and "slave" DC-DC converters on the basis of the requested output voltage from the inverter, the input-output current voltage information from the current/voltage sensors, the battery voltage information from the voltage sensor, and others (Abstract). More specifically, Tsuchiya teaches that the master DC-DC converter is made to "certainly drive," and performs adjustment of the number with slave DC-DC converters (par. 27, lines 2-3). The number, N, is a predetermined number based upon several calculations and determines the control method while maintaining maximum efficiency (pars. 21-26). Operation of the various DC-DC converters is based upon the value of the number, N (par. 27, lines 3-6).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the control method of Tsuchiya in the hybrid fuel cell system of Sugiura and Peng in order to optimize the operating efficiency where at least one to three different phases can be utilized based on need.

Regarding claims 3, 4, 7, and 8, Tsuchiya teaches that if $N=1$, only the master DC-DC converter will be in operation, and if $N=2$, both the master DC-DC converter 31 and the slave DC-DC converter 32 will be in operation, and finally, if $N=3$, the master

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DC-DC converter 31 and both of the slave DC-DC converters 32 and 33 will be operational (par. 27, lines 3-6).

With regards to claim 9, the fuel cell of Sugiura is inherently connected to load equipment to power the vehicle. At the very least it would have been obvious to one of ordinary skill in the art at the time of the invention to connect the fuel cell to load equipment because that is how all fuel cells deliver the generated power.

Regarding claim 10, Peng uses the term “converter” to generally include DC-DC, AC-AC, AC-DC, and DC-AC converters (col. 3, lines 46-49). As such, the converter of Peng is capable of handling all types of current. It is assumed that any control method set by an operator or programmer would conduct the phase changes in a synchronized manner.

Response to Arguments

The amendments to the claim have overcome the prior claim objections.

The 35 U.S.C. 112 rejection has been removed.

Applicant's arguments, see pages 6-8, filed October 14, 2009, with respect to the rejection(s) of claim(s) 1-4 and 6-10 under 35 U.S.C. 103 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of the newly found prior art reference above. While Applicant's explanation in the remarks has shown that the converter of Tsuchiya is far different than a three-phase bridge type converter, Tsuchiya has been relied upon for the teachings of the control method to increase the

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efficiency of the system. More specifically, the control of the three converters of Tsuchiya can be related to control of the three phases of Peng, with respect to the predetermined values.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to COLIN W. SLIFKA whose telephone number is (571)270-5830. The examiner can normally be reached on Monday-Thursday, 10:00AM-4:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Melvin Curtis Mayes can be reached on 571-272-1234. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

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USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/COLIN W SLIFKA/
Examiner, Art Unit 1793

January 3, 2010

/Melvin Curtis Mayes/
Supervisory Patent Examiner, Art Unit 1793